

**MECH 211****Fall 2004****Test 1**

Due September 27, 2004 at the start of class.

Show all work. Any force existing in an equilibrium equation must also be denoted on an appropriate and correct free body diagram. Clearly indicate final answers.

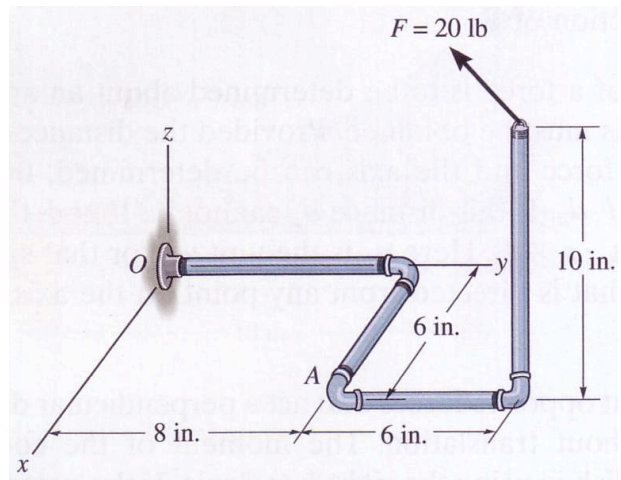
This test is taken under the Rice Honor Code system. You may consult only the textbook (Bedford and Fowler), notes that you have personally taken, and any material downloaded from the course website. You may use a calculator, including programmable calculators. The test must be taken during a 3-hour period, with an optional 30-minute break.

Time started: _____

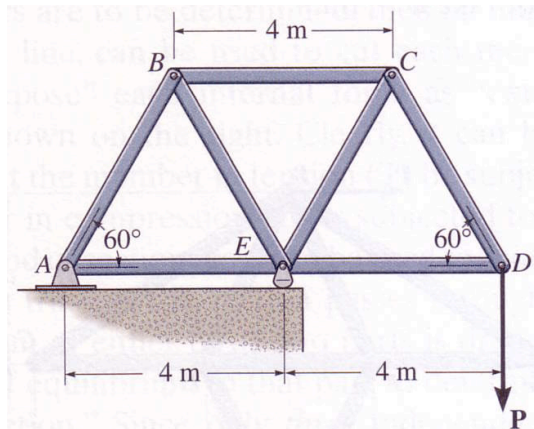
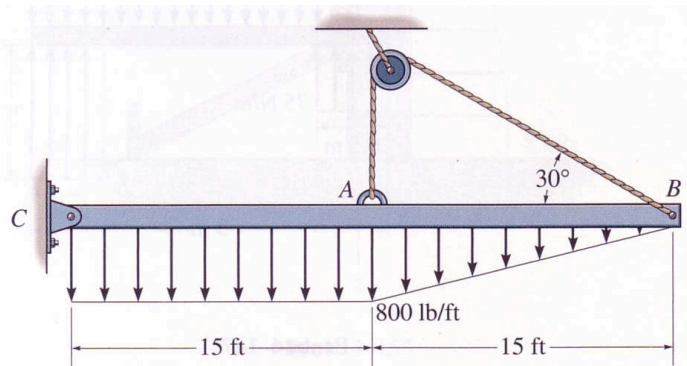
Time finished: _____

Pledge: _____

- The pipe assembly is subjected to the 20-lb force. The angles between the direction of the force and the x , y and z -axes are 60° , 120° and 45° respectively. Determine (a) the moment due to this force about point O , and (b) the moment of this force about the axis passing through points A and O .



- (Figure to the right.) The weightless beam is in equilibrium and subjected to the distributed load as shown. Determine the tension in the rope and the reactions at C .



- (Figure to the left.) If the maximum force that any of the truss members can support is 8 kN in tension or 6 kN in compression, determine the maximum force P that can be supported by the structure at joint D . Note that the support at joint E has an identical effect as a rolling support.

- The end C of the two-bar linkage rests on top of the center of the uniform density 50-kg block D . If the coefficients of static friction at C and E are $\mu_C = 0.6$ and $\mu_E = 0.3$, determine the largest vertical force P that can be applied at B without causing motion at any point in the system. What type of motion is caused if P is greater than this critical force? Neglect the mass of the bars in the linkage.

